



2016 Rhode Island Farm Energy Efficiency Program: Pilot Report



Commissioner Carol J. Grant

www.energy.ri.gov



EXECUTIVE SUMMARY

The Office of Energy Resources (OER), in partnership with National Grid, conducted a pilot farm energy efficiency program that provided free, comprehensive energy audits and financial incentives for recommended energy-saving measures to nine (9) farms across Rhode Island. The pilot began in late 2014 and continued through early 2016. Farms were selected for their business and size diversity and owner interest in energy efficiency. Farm types included a dairy farm, an egg farm, several greenhouse-based businesses ranging in size and operation, and several meat producers.

The goal of the pilot program was to assess the viability of farm-specific energy efficiency measures for Rhode Island farms. Energy efficiency measures found to be widely applicable and effective in reducing farm energy costs would form the basis of a farm-centric energy program to be available to all Rhode Island farms served by National Grid. The full Farm Energy Efficiency Program launched in April 2016.

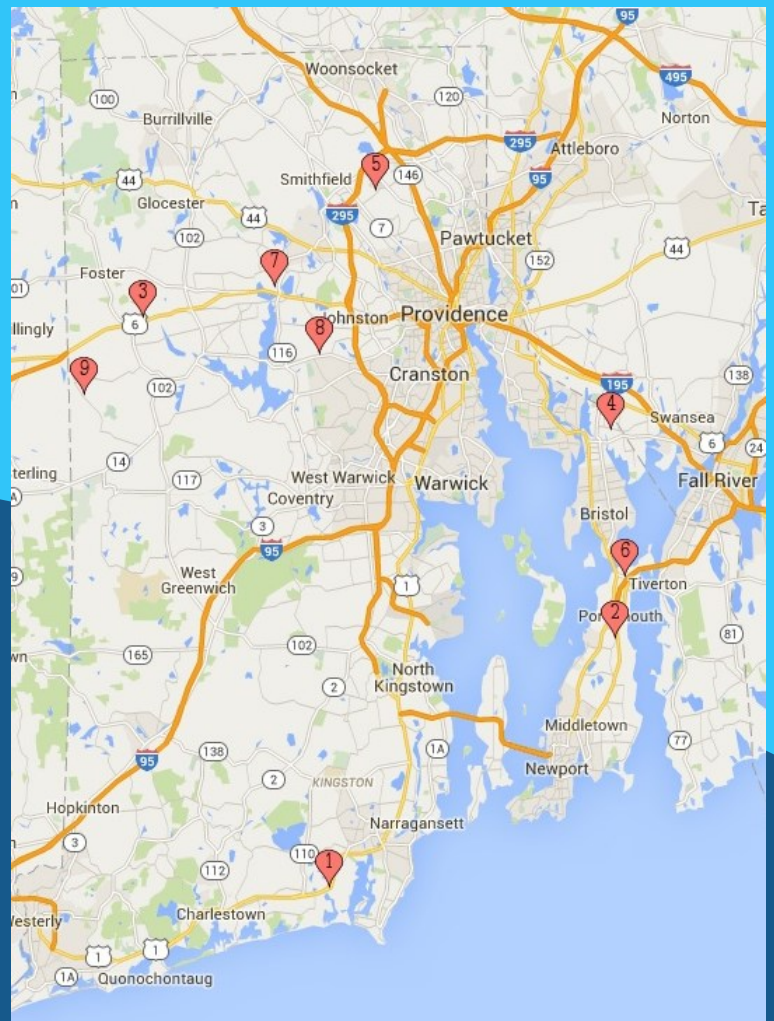
In total, over 102,000 kWh and 1,450 MMBtu of annual savings (an estimated \$56,900 total decrease in annual energy costs) were identified through the pilot energy audits. As of June 2016, 33% of the farms in the pilot had decided to move forward with installing some or all of their recommended energy efficiency measures.

PILOT PROGRAM ACHIEVEMENTS

- Nine (9) farms received free, comprehensive energy audits from an experienced farm energy auditor
- Seven (7) out of the nine (9) pilot farm audit reports identified opportunities to reduce the consumption of both delivered fuels and electricity
- 100% of the nine (9) pilot farms had opportunities to save electricity
- Over 102,000 annual kWh savings and 1,450 annual MMBtu savings were identified in the audit reports. These savings were estimated to equal \$56,900 in total annual energy costs
- As of September 2016, three (3) of the nine (9) farms were working to install all or some of the recommended measures

Full list of electric measures identified on pilot farms:

Technologies
Lighting Upgrades: LED conversions and/or occupancy sensors
Roll-up Greenhouse Sides: natural ventilation
Energy Efficient Inflation Fans: greenhouse applications
Reduced Wattage Heat Lamps
Energy Efficient Gable Fans
Insulation for an electrically heated and air-conditioned space
Energy Efficient Evaporator Fan Motor: refrigeration
Variable Speed Vacuum Pump: milking
Condensing Unit Upgrade: milking refrigeration system
Defrost Cycle Skip: refrigeration



Locations of pilot farms

PILOT PROGRAM BACKGROUND



In 2014, OER conducted a survey of Rhode Island farmers to gauge the need for a farm-specific energy efficiency program. The survey indicated strong farmer interest in energy efficiency and a heavy reliance on delivered fuels, such as propane and oil. For more survey results, please see the 2014 Farm Energy Survey Report on the OER website: www.energy.ri.gov/efficiency/farmenergy/.

After the survey, OER and National Grid partnered to further explore farm-specific energy efficiency opportunities. A pilot program was created to conduct in-depth energy efficiency audits for ten (10) Rhode Island farms located across the state. The goal of the pilot was to identify common electric and/or delivered fuels energy efficiency measures that could help farmers reduce their energy costs. Nine (9) of the ten (10) farms completed the pilot program and received free comprehensive energy audits.

After audit reports were delivered to the pilot farmers, incentives were offered for installing recommended energy efficient measures. As of June 2016, several pilot farmers were still installing recommended measures. Data from the audit reports were used to select energy efficiency measure offerings for the full Rhode Island Farm Energy Efficiency Program which opened in April 2016. Full program offerings are described in detail on page 6 of this report.

ENERGY EFFICIENCY DELIVERED FUELS MEASURES



Full list of delivered fuel measures identified on pilot farms:

- ◆ All nine (9) pilot farms used delivered fuels for some aspect of their farm business
- ◆ Seven (7) of the nine (9) pilot farms had at least one opportunity to decrease delivered fuels use
- ◆ Many delivered fuel technologies were brought to our attention through the pilot audits. However, the applicability of some measures was too low to support their inclusion in the full program offerings. Nevertheless, some of these other measures ought to be considered during custom, comprehensive energy audits.

Technologies
Energy Efficient Boiler for a Greenhouse Root-Bed Heating System
Perimeter and/or End Wall Insulation for Greenhouses
Digital Thermostats for Temperature Setbacks
Energy Efficient Furnaces
Infrared (IR) Canopies for Greenhouses
Stack Thimbles
Air Sealing via Weather Stripping, Patch Tape, Spray Foam, and Brush Seals
Insulated Space Partition Curtains
Destratification Fans
Window Curtain for a Large Single-Pane Window
Down-Sizing a Furnace Nozzle
Hot Water Supply Tub & Piping Insulation

2016 FULL FARM ENERGY PROGRAM OFFERINGS

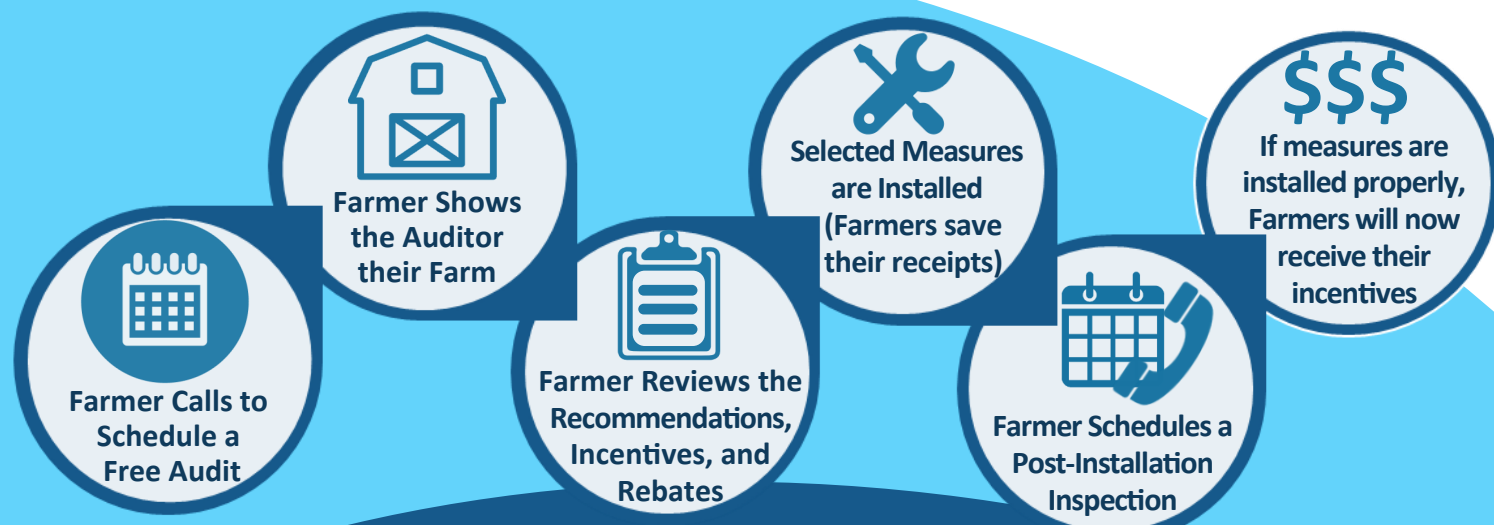
Delivered Fuels Measures:

- Infrared (IR) Canopies for Greenhouses
- Washable Insulation
- Perimeter Insulation for Greenhouses
- Ceiling Curtains for Greenhouses
- Insulated Space Partition Curtains
- Root-bed heating systems
- Energy efficient boilers and/or furnaces
- Digital Thermostats with setbacks
- Pipe Insulation
- Air Sealing Measures such as brush seals, weather stripping, stack thimbles, spray foam, and patch tape

Electric Measures:

- Lighting Upgrades
- Strip Curtains for Walk-in Coolers
- Grow Light Timers
- Reduced Wattage Heat Lamps
- Plug-in Thermostats
- Plug-in Timers
- Roll-up Sides for Greenhouses
- Defrost Cycle Skip for large refrigeration
- Permanent Split Capacitor (PSC) inflation fans for Greenhouses
- PSC and Electronically Commutated (EC) Evaporator Fan Motors
- Other standard offers from National Grid

How the Program Works for Farmers:



To Get Started Farmers should Call: 1-800-332-3333 or visit www.energy.ri.gov/efficiency/farmenergy/

The Farm Energy Efficiency Program is meant to be a simple and easy program for farmers. The free, no-obligation energy audits provided are not comprehensive, but are meant to help farmers identify the simplest means of reducing their energy costs. Energy assessors for the program have been trained to direct farmers towards more comprehensive energy audits if energy saving opportunities beyond this program's offerings are identified.



ADDITIONAL FARM ENERGY EFFICIENCY OPPORTUNITIES

U.S. Department of Agriculture (USDA):

Natural Resources Conservation Service (NRCS): Environmental Quality Incentives Program (EQIP) - Agricultural Energy Management Plan (AgEMP): a program to provide technical and financial assistance to agricultural producers and forest land owners to address energy concerns (on-farm energy conservation) www.nrcs.usda.gov/wps/portal/nrcs/main/ri/programs/financial/eqip/

Rural Development: Rural Energy for America Program (REAP): a grant and/or guaranteed loan program for farms and rural small businesses to assist with energy efficiency and/or renewable energy projects www.rd.usda.gov/programs-services/all-programs/energy-programs

Rhode Island Department of Environmental Management (DEM): Rhode Island Agricultural Energy Grant Program: a grant program to support agricultural projects that improve energy efficiency and/or facilitate renewable energy. For more information email: info@rifarmenergy.org or visit www.dem.ri.gov/programs/agriculture/farm-energy.php

Rhode Island Farm Energy Program: a project of the Rhode Island Resource Conservation and Development Area Council, Inc. that serves as a resource on energy as it relates to agriculture in Rhode Island. For information on many of the programs listed above and renewable energy opportunities visit: www.rifarmenergy.org



RENEWABLE ENERGY RESOURCES & OPPORTUNITIES

Commerce Rhode Island: Renewable Energy Fund (REF): a grant program for renewable energy projects in Rhode Island commerceri.com/finance-business/renewable-energy-fund/

National Grid: Renewable Energy Growth (REG) Program: a performance-based incentive program for renewable energy projects connected in National Grid service territory www.nationalgridus.com/narragansett/business/energyeff/4_dist_gen.asp

U.S. Department of Agriculture (USDA): Rural Development: Rural Energy for America Program (REAP): a grant and guaranteed loan program for farms and rural small businesses to assist with energy efficiency and/or renewable energy projects www.rd.usda.gov/programs-services/all-programs/energy-programs

Rhode Island Department of Environmental Management (DEM): Rhode Island Agricultural Energy Grant Program: a grant program to support agricultural projects that improve energy efficiency and/or facilitate renewable energy. For more information email: info@rifarmenergy.org or visit www.dem.ri.gov/programs/agriculture/farm-energy.php



Picture By: Dirk Ingo Franke

OTHER RESOURCES & OPPORTUNITIES

Rhode Island Office of Energy Resources: Driving Rhode Island to Vehicle Electrification (DRIVE) Program: a rebate program that provides incentives to Ocean State drivers who purchase or lease a new qualified electric vehicle (EV). To learn more about the program visit www.drive.ri.gov

Rhode Island Infrastructure Bank: Commercial-Property Assessed Clean Energy (C-PACE) Program: an innovative financing model that enables building owners to fund 100% of the cost of energy efficiency, renewable energy, water conservation, environmental health and environmental safety improvements. Owners repay the cost of eligible improvements over a period of up to 25 years through an additional charge (“assessment”) on their property tax bill or other municipal bill. For more information email the C-PACE Program Manager at info@RI-CPACE.com

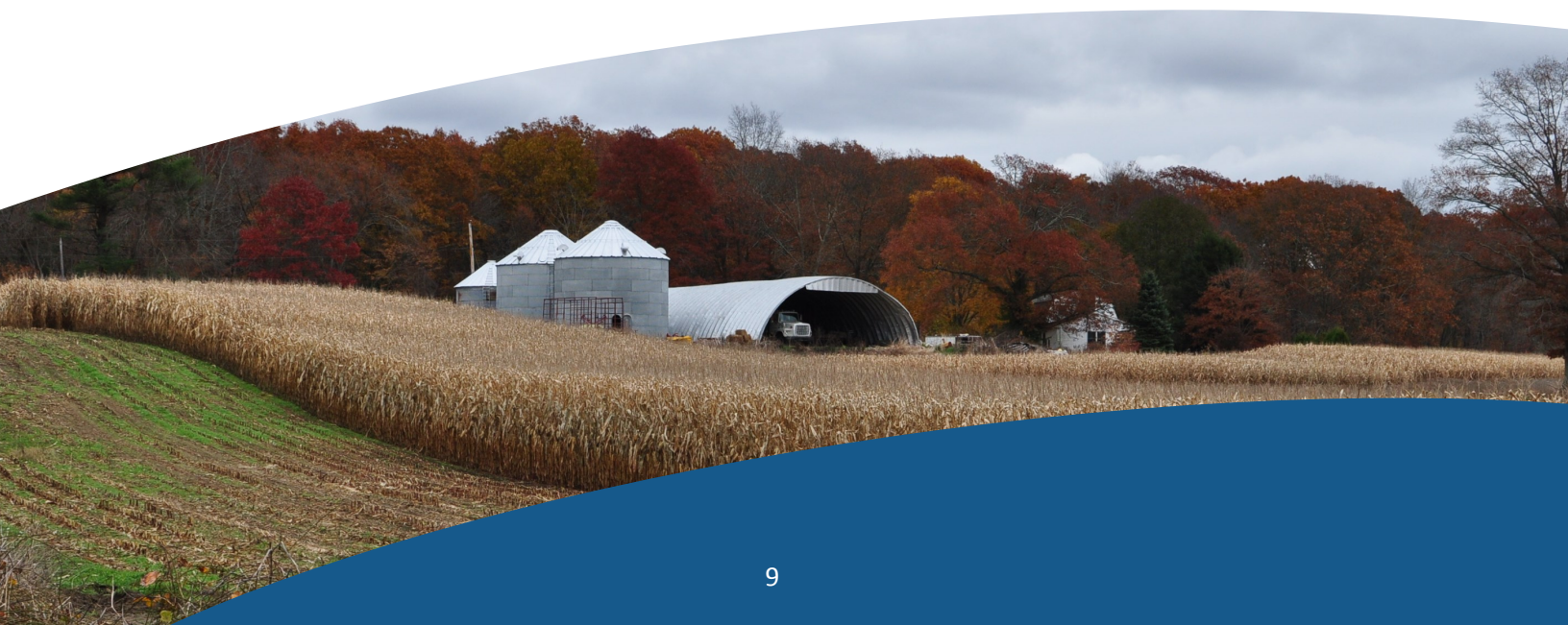
U.S. Department of Agriculture (USDA):

Natural Resources Conservation Service (NRCS): Environmental Quality Incentives Program (EQIP): a program to provide technical and financial assistance to agricultural producers and forest land owners to address natural resource concerns www.nrcs.usda.gov/wps/portal/nrcs/main/ri/programs/financial/eqip/

National Institute of Food and Agriculture (NIFA): Sustainable Agriculture Research and Education (SARE): a grant program for farmers, ranchers, and ag professionals for research, education, and professional development www.sare.org/Grants

Rhode Island Farm Service Agency (FSA) Programs: Rhode Island’s FSA offers farm loan, conservation (including biomass crop assistance), disaster assistance, and price support programs www.fsa.usda.gov/state-offices/Rhode-Island/

Rhode Island Department of Environmental Management (DEM): Local Agriculture and Seafood Act Grants Program (LASA): a grant program to support the growth, development, and marketing of local food and seafood in Rhode Island www.dem.ri.gov/programs/agriculture/grants.php





STATE OF RHODE ISLAND

OFFICE OF ENERGY RESOURCES

The Office of Energy Resources works closely with private and public stakeholders to increase the reliability and security of our energy supply, reduce energy costs and mitigate price volatility, and improve environmental quality. Rhode Islanders spend over \$3 billion per year on energy to light their homes, keep the heat on, and fuel their vehicles. Fossil fuels such as natural gas, fuel oil, and gasoline supply the vast majority of these energy needs. By recommending and implementing smart energy policies, such as those that promote energy efficiency and renewable energy, OER helps reduce Rhode Island's dependence on these out-of-state fuels, advancing our State as a national leader in the new clean energy economy.

OER operates at the nexus of the many ongoing efforts to transform the Ocean State energy system. Some core functions of the office include:

- Developing, administering, and monitoring a variety of programs designed to promote energy efficiency, renewable energy, alternative fuels, and energy assurance.
- Offering technical assistance and funding opportunities for end-users including residents, businesses, and municipalities.
- Providing policy expertise and support related to strategic energy planning, energy assurance, and clean energy workforce development.
- Leveraging, coordinating, and aligning inter-agency, public-private, regional, and federal efforts to reach and exceed energy goals.

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This program was made possible by the collaboration of:

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Supplemental Information from the 2012 Agricultural Census:

Rhode Island Farms by North American Industry Classification System (NAICS)	% of Farms
Greenhouse, nursery, and floriculture production (1114)	20.6
Animal aquaculture and other animal production (1125, 1129)	19.6
Sugarcane farming, hay farming, and all other crop farming (11193, 11194, 11199)	15.8
Beef cattle ranching and farming (112111)	12.4
Vegetable and melon farming (1112)	11.2
Poultry and egg production (1123)	7.1
Fruit and tree nut farming (1113)	5.2
Sheep and goat farming (1124)	4.3
Hog and pig farming (1122)	1.6
Dairy cattle and milk production (11212)	1.0

Rhode Island Office of Energy Resources | Becca Trietch, Chief Program Development
One Capitol Hill | Providence, RI 02908 | Becca.Trietch@energy.ri.gov | 401.574.9106 | www.energy.ri.gov